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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/613,214

07/07/2003

Jan Westerling

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02/15/2005

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EXAMINER

DEB, ANJAN K

ART UNIT

PAPER NUMBER

2858

DATE MAILED: 02/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/613,214

Applicant(s)

WESTERLING ET AL.

Examiner

Anjan K Deb

Art Unit

2858

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11/24/2003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1,2, 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schultheiss (US 2002/0020216 A1).

Re claim 1,2, 22 Schultheiss discloses level gauge (Fig. 1) apparatus and method for measuring the level of the surface of a product stored in a tank (container), said level gauge adapted to transmit and receive microwaves (radar system) towards said surface based on at least a first and second frequency band (plurality of frequencies), and determining the level based on an evaluation of the time lapsed (transit time) between the received and the transmitted waves (para [0016][0017][0018]).

While Schultheiss disclosed transmitting and receiving signals at a number of frequencies (fa,fb...) it did not expressly disclose transmitting a second frequency band, which is at least 1.5 or 2 times the center frequency of the first frequency band.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Schultheiss by adding transmitting a second frequency band, which is at least 1.5 or 2 times the center frequency of the first frequency band to obtain best suited frequency for obtaining measurable peak echo signals at the selected frequency (see Schultheiss para [0020][0021] and claim 6).

Re claims 23,24 Schultheiss disclosed all of the claimed limitations as set forth above including a signal analyzer 5 (Fig. 1, 3) for analyzing first and second echo spectrum (Fig. 2a,2b)(para [0020][0023] and selecting the best suited frequency of microwave generator based on the echo spectrum (see Schultheiss para [0020][0021]).

3. Claims 1-14, 19, 20, 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Locke (US 5,406,842) in view of Fehrenbach (US 20030025630 A1).

Re claim 1,2,22 Locke discloses level gauge (Fig. 1) apparatus and method for measuring the level of the surface (14) of a product stored in a tank (Fig. 1), said level gauge including a radar for transmitting microwaves towards said surface, for receiving microwaves reflected by said surface and for determining the level based on an evaluation of the phase difference between the received and the transmitted waves (column 2 lines 15-65). Locke measured level of surface 14 in tank by measuring the phase difference between reflected 19 and transmitted signal from antenna 2 and level gauge is adapted to transmit and receive microwaves on at least a first and a second frequency band. As regard to transmitting a second frequency band, which is at least 1.5 or 2 times the center frequency of the first frequency band, this feature is inherently disclosed as it would be included in the range of frequencies $(f_1, f_2, \dots, f_{2N})$ (Fig. 4) disclosed by Locke (column 2, lines 16-20).

Locke did not expressly disclose determining the level based on an evaluation of the time lapsed between the received and the transmitted waves.

Fehrenbach discloses level gauge (transmitter) determining level based on an evaluation of the time lapsed between the received and the transmitted waves wherein time lapsed (time of travel) is determined by measuring the phase shift of the reflected wave in relation to the transmitted wave.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Locke by adding determining level based on an evaluation of the time lapsed between the received and the transmitted waves based on the phase difference as disclosed by Fehrenbach for accurately measuring level of material in tank.

Re claims 3,4,19 Locke discloses multiband antenna since it is used for radiating a range of frequencies having bandwidth necessary to support the transmitted waveform and the antenna suitable for mounting on the pressure window of a viewing port of a storage tank outside the storage tank as in FIG.1. Locke discloses tight pressure seal (column 3 lines 23-26) for antenna mounted on a pressure window so as to resist chemical effects by products in the tank (column 1 lines 39-48).

Re claims 5-9 Locke discloses patch array multiband antenna (array of printed circuit radiating elements 11) (column 2 lines 37-56)(Fig. 2) for radiating signals in a predetermined microwave frequency band, a circuit (Fig. 3) for generating 8 microwave frequency bands including switching 16 to allow the radar to operate in a frequency band (column 3 lines 65-67).

Re claim 10-12, Locke discloses signal analyzing and control unit for operating transmit and receive antenna in a predetermined frequency band (column 4 lines 16-35).

Re claims 13,14 a waveguide for transmitting microwave signal from generator to antenna is inherently disclosed as it would be required for transmitting microwave signal from microwave generator to the antenna (Fig. 3).

Re claim 20, Locke and Fehrenbach did not expressly disclose first frequency having high penetration in an atmosphere prevailing above the surface of the tank but would have been obvious as it is required for the microwave signal for contacting the surface of material in the tank for determining material surface level.

Re claims 23,24 Locke as modified by Fehrenbach disclosed all of the claimed limitations including a signal analyzer for analyzing first and second echo spectrum (see DFT disclosed by Locke, column 5 lines 48-55) and selecting the frequency of microwave generator 8 by frequency select control 16 (Fig. 3).

4. Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Locke (US 5,406,842) and Fehrenbach (US 20030025630 A1) in view of Josefsson et al (US 6,081,241).

Re claims 15-18, Locke combined with Fehrenbach did not expressly disclose ridge waveguide.

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Josefsson et al. disclose microwave antenna transmission device comprising ridge waveguide, which has the advantage of allowing a relatively broad bandwidth in the fundamental mode of a microwave, which propagates in the waveguide.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Locke and Fehrenbach by adding ridge waveguide disclosed by Josefsson et al. for coupling microwave generator to antenna for enabling relatively broad bandwidth in the fundamental mode of a microwave which propagates in the waveguide.

5. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Locke (US 5,406,842) and Fehrenbach (US 20030025630 A1) in view of Swanson (US 4,820,970).

Re claim 21, Locke and Fehrenbach did not expressly disclose second frequency of microwave having narrow beam.

Swanson (US 4,820,970) discloses second microwave radiation frequency having narrow beam for measuring water content in fluid under different conditions of a fluid.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Locke by adding second frequency having a narrow beam as disclosed by Swanson for measuring water content in fluid under different conditions of a fluid.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

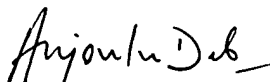
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Fehrenbach (US 6606053 B2) discloses microwave sensor for measuring level of a material in a tank.

Champion (US 5,651,286) discloses sensing material (fluid) level by measuring the time between incident and reflected pulse signal.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Anjan K. Deb whose telephone number is 571-272-2228. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lefkowitz Edwards can be reached at 571-272-2180.



Anjan K. Deb

Patent Examiner

Art Unit: 2858

2/9/05

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